PB85-213965

Superfund Record of Decision (EPA Region 5) Reilly Tar Site, Minnesota, June 1984

(U.S.) Environmental Protection Agency
Washington, DC

6 Jun 84

U.S. Department of Commerce
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EPA/ROD/R05-84/008
June 1984

PB85-213965

EPA

Superfund Record of Decision:

Reilly Tar Site, MN

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1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
EPA/ROD/RO5-84/008		PB85 213965 /AS

4. TITLE AND SUBTITLE	5. REPORT DATE
SUPERFUND RECORD OF DECISION: Reilly Tar Site, MN	06/06/84
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT NO.
Same as box 12.	11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS	13. TYPE OF REPORT AND PERIOD COVERED
U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460	Final ROD Report
	14. SPONSORING AGENCY CODE 800/00

15. SUPPLEMENTARY NOTES

16. ABSTRACT

The Reilly Tar and Chemical Site occupies 80 acres in St. Louis Park, Minnesota. The Republic Creosote Works, which operated at the site between 1917 and 1972, fractionalized coal tar into various oils and produced creosote. The wastes resulting from this process polluted the land surface of the site and four underlying aquifers. The pollutants consisted primarily of polynuclear aromatic hydrocarbons (PAH) and related coal tar derivatives.

The cost-effective remedial alternative selected for this site is treatment of the St. Louis Park Well SLP-15/10 by a granular activated carbon (GAC) water treatment system. GAC provides best available technology to restore drinking water quality and will also help prevent the pread of contamination. The estimated total capital cost is $750,000 and the first year O&M cost is estimated at $188,000.

Key Words: Ambient Water Quality Criteria, Benzo(a) Pyrene, Drinking Water Supplies, PAH, Risk Level, Operational Target, Ground Water, Ground Water Treatment, RCRA Part 264, Best Available Technology, Carbon Adsorption

DIS

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Reilly Tar Site, MN Contaminated media: gw, sw, soil, peat bog Key contaminants: PAHs, coal tar wastes, oils, grease, phenolics, creosote		

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS *(This Report)*	21. NO. OF PAGES
	None	39
	20. SECURITY CLASS *(This page)*	22. PRICE
	None	$8.50

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ROD ISSUES ABSTRACT

Site: Reilly Tar, Minnesota

Region: V

AA, OSWER
Briefing Date: May 25, 1984

SITE DESCRIPTION

The Reilly Tar and Chemical Site occupies 80 acres in St. Louis Park, Minnesota. The Republic Creosote Works, which operated at the site between 1917 and 1972, fractionalized coal tar into various oils and produced creosote. The wastes resulting from this process polluted the land surface of the site and four underlying aquifers. The pollutants consisted primarily of polynuclear aromatic nydrocarbons (PAH) and related coal tar derivatives.

SELECTED ALTERNATIVE

The cost-effective remedial alternative selected for this site is treatment of the St. Louis Park Well SLP-15/10 by a granular activated carbon (GAC) water treatment system. GAC provides best available technology to restore drinking water quality and will also help prevent the spread of contamination. The estimated total capital cost is $750,000 and the first year O&M cost is estimated at $188,000.

ISSUES AND RESOLUTIONS

1. Using the "Ambient Water Quality Criteria for Polynuclear Aromatic Hydrocarbons (PAH)," published by EPA, a target health risk of 10^{-6} was recommended for the sum of carcinogenic PAH. The 10^{-6} level for Benzo(a) Pyrene (BaP), 2.8 ng/l, was used as a target for all carcinogenic PAH since BaP is considered to be the most potent carcinogen of the PAH family. Using 2.8 ng/l for the 10^{-6} target for all carcinogenic PAH is a conservative approach and is justified due to the relationship of other PAH to the activation of carcinogenic PAH, the inability of the analytical method to distinguish between certain carcinogens and other PAH, and the possibility that other PAH may still be toxic, tumor promoters and/or mutagens.

KEY WORDS

- Ambient Water Quality Criteria
- Benzo(a) Pyrene
- Drinking Water Supplies
- Polynuclear Aromatic Hydrocarbons (PAH)
- Risk Level

ISSUES AND RESOLUTIONS

KEY WORDS

2. An operational target of 280 ng/l total PAH was selected due to the difficulty in monitoring for the low levels of carcinogenic PAH. The operational target is based on a ratio of carcinogens to total PAH calculated using site data. The operational target will be used to monitor operations of the treatment system and will be adjusted periodically.

- Operational Target
- PAH

3. The target health risk of 10^{-6} was selected based on a range of risk levels resulting from treating contaminated ground water for direct public consumption. The level was not selected to satisfy the ground water protection requirements of RCRA Part 264. The next operable unit for this site will address off-site remedial measures to control contaminated ground water plumes in the four aquifers beneath the site. The next operable unit will also consider the requirements for restoring ground water under Part 264 of RCRA.

- Ground Water
- Ground Water Treatment
- RCRA Part 264
- Risk Level

4. EPA has selected granular activated carbon (GAC) as the recommended alternative capable of achieving the target for carcinogenic PAH (based on BaP) of 2.8 ng/l which corresponds to a 10^{-6} health risk factor. Use of GAC has proven to be reliable and is considered to be effective for water supply treatment since it can be operated over a wide range to remove carcinogenic and other compounds to below detection limits, it can accept slug loads, it can be maintained with minimal operator oversight, and there is no generation of by-products in the effluent stream.

- Best Available Technology
- Carbon Adsorption

Record of Decision

Remedial Action Alternative Selection

Site: Reilly Tar Site in St. Louis Park, Minnesota.

Documents Reviewed

I have reviewed the following documents describing the analysis of cost-effectiveness of remedial alternatives for the Reilly Tar site in St. Louis Park, Minnesota.

- "Evaluation of Ground Water Treatment and Water Supply Alternatives for St. Louis Park, Minnesota," CH_2M-Hill, June 1983.
- Summary of Remedial Alternative Selection.
- "Study of Ground Water Contamination in St. Louis Park, Mn.," E. A. Hickock and Associates, November 1981.
- "Transport of Coal Tar Derivatives in the Prairie du Chien-Jordan Aquifer," USGS, February 1981.
- "Recommended Plan for a Comprehensive Solution of the Polynuclear Aromatic Hydrocarbon Problem in the St. Louis Park Area," Environmental Research and Technology, Incorporated, April 1983, Performed for and at the expense of Reilly Tar and Chemical Corporation.

Description of Selected Remedy

- Construction of a granular activated carbon (GAC) water treatment system at St. Louis Park Well 15/10 as a major component of restoration of drinking water quality to St. Louis Park, Minnesota.
- Operation of the above system at 1200 gallons per minute will also serve as a major component of a gradient control well system. The operation of the gradient control well system will protect the drinking water supplies of neighboring cities from contamination, and allow St. Louis Park eventually to open other wells closed due to contamination.

Declarations

Consistent with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and the National Contingency Plan (40 CFR Part 300), I have determined that installation of a granular activated carbon water treatment system at St. Louis Park well 15/10 is a cost-effective remedy and provides adequate protection of public health, welfare, and the environment. The Minnesota Pollution Control Agency has been consulted and agrees with the approved remedy. In addition, this action will require future operation and maintenance to ensure the continued effectiveness of the remedy. These activities will be considered as part of the approved action and eligible for Trust Fund monies for a period of up to one year.

I have also determined that the action being taken is appropriate when balanced against the availability of Trust Fund monies for use at other sites, and is consistent with a permanent remedy at the site.

I am approving the installation of a granular activated carbon treatment system since a delay would create an unnecessary risk to the public health during peak usage of the City's water supply and allow the contamination to migrate further towards other municipal water supplies.

The State has largely completed a feasibility study for remedying the remaining problems at the site. The extent of ground water contamination has been determined for some additional aquifers affected by the Reilly Tar operation.

Following completion of the feasibility study, the State will conduct a public meeting on any additional remedies required to mitigate the contaminated ground water plume and source of contamination at the site. After submittal of their recommendation, I will make a further determination on the appropriate remedy for the remaining study areas.

6/6/84
Date

Lee M. Thomas
Assistant Administrator

May 25, 1984

RECORD OF DECISION

REILLY TAR, MINNESOTA

EXECUTIVE SUMMARY

PURPOSE

The purpose of this Record of Decision (ROD) is to select an appropriate remedial action at the Reilly Tar site, St. Louis Park, Minnesota that is consistent with the requirements of CERCLA and the NCP. The Assistant Administrator has been delegated the authority for that approval.

The primary source of drinking water for 3 cities, St. Louis Park, Edina, and Hopkins, which border Minneapolis has been contaminated by coal tar compounds produced by Reilly Tar. Since 1978, a total of 6 wells were closed and water conservation measures and contingency plans for purchase of alternate water supplies have been implemented by St. Louis Park. During fire emergencies, contaminated wells must be turned on. A total of 33% of the pre-1978 water supply capacity has been usurped by contamination. Public opinion is in favor of restoring adequately treated water to the distribution system as soon as possible. The State share of this project is 10%. Concurrence by all Federal and State authorities has been obtained. Unfortunately, the City of St. Louis Park will have to continue water conservation measures this summer since operation of the system will start 8 months after approval. The public would support construction beginning this summer.

BACKGROUND

The Reilly Tar and Chemical site occupied 80 acres in St. Louis Park, Minnesota. It was called Republic Creosote Works and operated between 1917 and 1972. The Company fractionalized coal tar into various oils and produced creosote. The creosote and waste products resulting from the Company's process polluted the surface of the site and 4 aquifers. The deep aquifers were polluted by direct migration of contaminants with the aquifers via a deep well located on-site. The contaminants were either injected into the well or overflowed into the well casing during runoff events and spills on the site. Consequently, many private wells and eventually municipal supplies became contaminated. Limited studies on portions of the site started in 1969. Ground water studies began in 1974 and drinking water treatability testing was initiated by a cooperative agreement between MPCA and EPA in 1981. The work performed under this cooperative agreement, funded at $400,000, included: (1) a well survey to determine the amount of multi-aquifer wells that were conveying contamination between aquifers; (2) a cleanout of one on-site well known to contain coal tar contamination; and (3) a feasibility study for water treatment at St. Louis Park. A second cooperative agreement was awarded in December 1982 for $1.9 million. This agreement was to accomplish the following: (1) an initial remedial measure to abandon multi-aquifer wells; (2) model gradient control well systems; (3) a remedial investigation to determine areal extent of contamination of the source material; and (4) a feasibility study for source

control measures. The initial remedial measure was delayed while Reilly completed and presented the findings of their own feasibility study. Now that negotiations with Reilly have terminated the activities funded by the second cooperative agreement will be completed during 1984.

The feasibility study funded by the first cooperative agreement recommended restoration of drinking water quality to the contaminated aquifer by installing granular activated carbon (GAC) treatment at an existing contaminated well. That action is the subject of this Record of Decision. This alternative provides a multi-purpose project and multiple benefits. It not only provides a cost-effective alternative when compared to other alternatives for restoring drinking water quality but, it also helps block the spread of contamination which would otherwise force the closure of more municipal wells.

The attached chart lists the alternatives, costs, advantages, and disadvantages to restore safe drinking water quality and quantity to the City of St. Louis Park. Alternative 2, 3, and 4 restore drinking water to St. Louis Park. Alternative 4; however, considers various levels of treatment of the contaminated aquifer to provide water quality to St. Louis Park. Alternatives 2, and 3 provide water from uncontaminated sources. Alternative 4, by providing water from the contaminated aquifer also assists in retracting the plume and allows the opening of 2 other closed wells. Therefore, any additional cost to retract the plume will be minimized. The capital cost of the GAC treatment system is $633,000. Restoration of the existing well where the treatment system will be constructed is estimated to cost $49,000. Design is estimated at $68,000. Therefore the total project cost is estimated at $750,000. The first year O&M cost is estimated at $198,000.

The public, through the efforts of St. Louis Park and MPCA, have been well informed of the drinking water problems since 1978. Thus, at the public meeting where the MPCA presented the proposed GAC alternative, the primary concerns of the citizens was the urgency of restoring the drinking water on a timely basis. Another main concern regarded the payment of the system. The citizens were told that the proposal would be submitted to EPA for a funding decision and that costs would be recovered, by legal means, from the Reilly Tar and Chemical Corporation. The City keeps the public informed of the drinking water problem on a monthly basis through committee meetings specifically established for this problem.

The State and Region recommend implementation of GAC treatment to a level that represents 10^{-6} health risk or less. This alternative accomplishes The objective of restoring water quality and quantity to St. Louis Park. All other alternatives provide adequate water quality but do not block the spread of the contaminated plume and allows the opening of previously closed wells.

FURTHER NEEDS FOR SITE CLEANUP

There are 3 other aquifers contaminated with PAH wastes from Reilly Tar. These aquifers may need remedial action in order to protect future uses of the uncontaminated portions of the aquifers. This may require pump-out wells to limit the spread of contamination and protect down-gradient use of the aquifer. These aquifers currently have limited use in the areas of contamination and

pose no immediate endangerment to municipalities' drinking water. In addition, creosote waste has accumulated in surface areas and acts as a continuing source of ground water contamination. The State is completing feasibility studies for both source control measures and additional ground water control measures. An additional Record of Decision will be prepared to request approval of these additional measures. The attached schedule shows the sequence and duration of site activities.

ENFORCEMENT STATUS

EPA and U.S. DOJ is aggressively proceeding with litigation against the Reilly Tar and Chemical Company. Protracted discussions with Reilly Tar have not produced a concurrence by Reilly with the stated objectives of the EPA and MPCA.

NEXT STEPS

Milestones

	Date
Sign Record of Decision	May 1984
Amend CA for Design and Construction	June 1984
Complete Design	August 1984
Complete Construction	June 1985

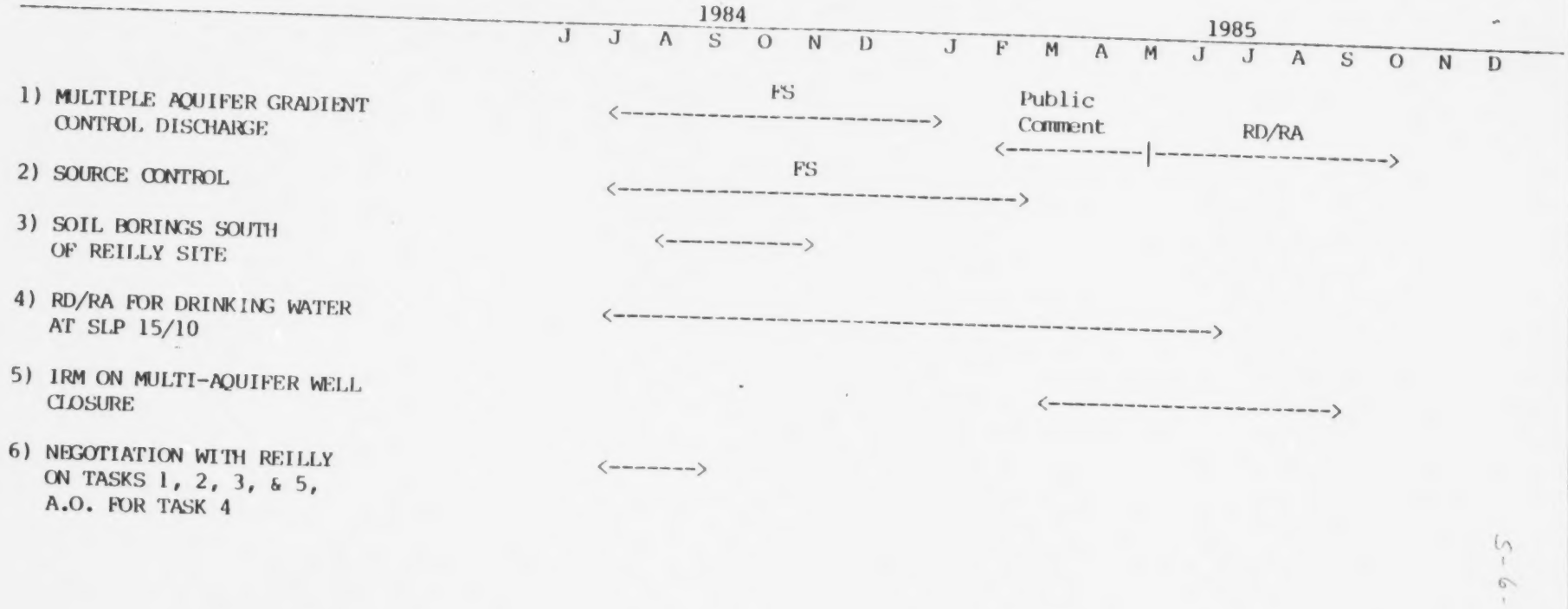
Alternative	Cost ($1,000) Capital	Present Worth	Public Health Considerations	Environmental Considerations	Technical Considerations	Public Comment	Other
1. No Action.	-	-	Unacceptable exposure to PAH if summer or fire demand requires use of contaminated well. Continued water shortages.	Continued migration of contaminated ground water; leading to contamination of Edina's water supply.	-	High resistance.	
2. Hookup to Minneapolis.	$250	$8,102	Reduces public health threat to less than 10^{-6}.	Continued migration of contaminated ground water; leading to contamination of Edina's water supply.	Relies on simple technology. No treatment is required.	Acceptable.	Has significantly higher O&M and present worth cost.
3. Drill Deeper Wells.	$1,870	$2,916	Reduces public health threat to less than 10^{-6}.	Continued migration of contaminated ground water leading to contamination of Edina's water supply. Depletes limited water resource in deeper aquifer.	Relies on proven construction technology.	Acceptable. to St. Louis Park, but not to Edina or Hopkins.	Has second highest present worth cost.
4. Aquifer Treatment.							
A. Ozone	$374	$1,618	At 2000 ng/l of PAH, removes taste and odor, but results in 10^{-5} to 10^{-6} risk.	Blocks migration and allows additional wells to be opened.	Not used on wide scale. Less responsive to slug loading than GAC. Would be expensive to retrofit if treatment goals change. Certainty that target risk levels will be consistently met is low due to operational inflexibility.	Acceptable.	Present worth Present worth is less than GAC at high risk level, but more at lower treatment goals change.
	$459	$2,109	At 1000 ng/l of PAH, results in 10^{-5} to 10^{-6} risk.				
	$709	$2,434	At 280 ng/l of PAH, results in 10^{-6} or less risk.				

Alternative	Cost ($1,000) Capital	Present Worth	Public Health Considerations	Environmental Considerations	Technical Considerations	Public Comment	Other
4. B. Granular Activated Carbon (GAC)	$633	$2,150	At 2000 ng/l of PAH, removes taste and odor but results in 10^{-5} to 10^{-6} risk.	Blocks migration and allows additional wells to be opened.	Considered best available technology. Dependable over a wide range of operating conditions. Responds well to slug loading Likely to consistently meet risk target.	Acceptable.	Present worth is less than other technologies a recommended treatment level.
	$633	$2,263	At 1000 ng/l of PAH, results in 10^{-5} to 10^{-6} risk.				
	$633	$2,405*	At 280 ng/l of PAH, results in 10^{-6} or less risk.**				

* Recommended Alternative

** 280 ng/l is the operational performance target for the GAC treatment system at this site. The carcinogenic PAH will be reduced to a level less than or equal to 2.8 ng/l as a result of the operational performance target. This will assure that the health risk to the population is less than or equal to a 10^{-6} health risk.

REILLY TAR
SCHEDULE OF REMEDIAL ACTIVITIES


1984
J J A S O N D
1985
J F M A M J J A S O N D
1) MULTIPLE AQUIFER GRADIENT CONTROL DISCHARGE
FS
Public Comment
RD/RA
2) SOURCE CONTROL
FS
3) SOIL BORINGS SOUTH OF REILLY SITE
4) RD/RA FOR DRINKING WATER AT SLP 15/10
5) IRM ON MULTI-AQUIFER WELL CLOSURE
6) NEGOTIATION WITH REILLY ON TASKS 1, 2, 3, & 5, A.O. FOR TASK 4

9-5

Summary of Remedial Alternative Selection

Reilly Tar and Chemical Company

St. Louis Park, Minnesota

SITE LOCATION AND DESCRIPTION

The Reilly Tar and Chemical Company site occupied 80 acres of land located in St. Louis Park, Minnesota. A copy of a site map is attached (Figure 1). The plant site, called the Republic Creosote Works, was located west of Gorham, Republic and Louisiana Avenues, south of 32nd Street, east of Pennsylvania Avenue, and north of Walker Street. The company no longer owns the land; the City of St. Louis Park purchased the land from Reilly in 1972 and it is currently owned by the St. Louis Park Housing and Redevelopment Authority. The City is contiguous to the City of Minneapolis and exhibits a similar population density. Currently, the site is a park with a portion of it developed with condominiums. It is located in the midst of a residential area with some small industry.

SITE HISTORY

From 1918 to 1972 the company operated a coal tar distillation facility and wood preserving plant. Its primary production was creosote. The chemical compounds associated with this process are polynuclear aromatic hydrocarbons (PAH) and phenolics. Many of these compounds pose health risks and some are carcinogenic. The release to the environment of these compounds occurred during the coal distillation process and from materials stored on the site. The materials were apparently dumped into a well, referred to as W-23, which penetrated to the Mt. Simon/Hinckley Aquifer, a depth of about 900 feet. The well was cleaned out by the Minnesota Pollution Control Agency (MPCA) to a depth of 866 feet. Coal tar was removed down to a depth of 740 feet. Evidence of contamination of the Mt. Simon/Hinckley Aquifer has not been found at this time. Wastes containing coal tar and its distillation by-products were discharged, as a matter of disposal practice, overland into ditches that emptied into a peat bog south of the site. This practice, according to Reilly, occurred from 1917 to 1939. Figures 3a and 3b display, respectively, photos taken in 1947 - when the wood treating process was very active and in 1980 - after the City of St. Louis Park had landscaped the property and allowed some construction on the site. In 1940 and 1941 Reilly installed a wastewater treatment plant and discharged the effluent into the bog south of the site. The values of both phenolics and oil and grease in the discharge water varied typically from 100 to 1000 milligrams per liter. This discharge continued for the duration of Reilly's operation. The peat bog has retained contamination that was discharged over the years and, as is explained below, is now a major source of ground water contamination.

1-a

FIGURE 1

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FIGURE 2

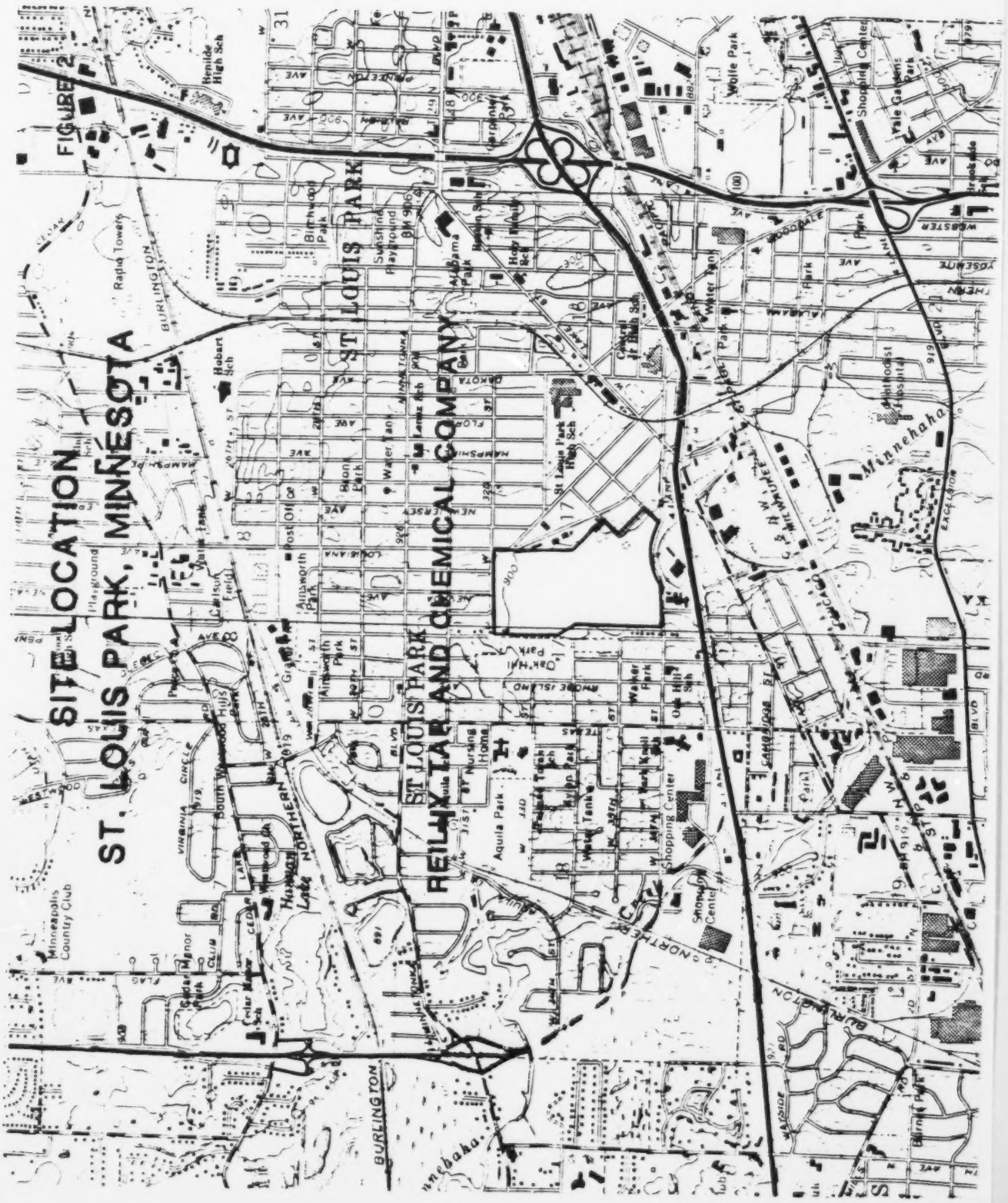
SITE LOCATION
ST. LOUIS PARK, MINNESOTA
ST LOUIS PARK
REILLY TAR AND CHEMICAL COMPANY
Minneapolis Country Club
Hidden Lake
Aquila Park
Oak Hill Park
Minnehaha
Shopping Center
Nursing Home
Water Tank
Post Office
Ball Field
Playground
Swimming Pool
Hospital
Radio Towers
BURLINGTON
NORTHERN
Minnehaha Creek

FIGURE 3(a)

1-C

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FIGURE 3(b)

In 1972 the plant was dismantled and the land sold to the City of St. Louis Park. In 1973 a storm water runoff collection system was built which fed into a lined pond on the site (Figure 3b). The pond on the site discharges into a drain which is routed to another pond off-site before it eventually discharges into Minnehaha Creek. The City of St. Louis Park (SLP) monitors the discharge into the creek. Construction of a block of condominiums on the northern part of the site began in 1976. At this time, no further construction is underway, although plans for new development of the site are pending by the Housing and Redevelopment Authority. All excavation of material has been inspected by the State and if found contaminated, the soils were disposed of.

The City of St. Louis Park drilled its first municipal well, W112, in 1932. The well, drilled to the Prairie du Chien-Jordan Aquifer, was closed within two weeks of its startup because of bad taste and odors. Several private wells near the plant site also exhibited contamination in water drawn from the Drift/Platteville Aquifer, during the 1930's and 1940's. Municipal wells continued to be constructed into the Prairie du Chien-Jordan Aquifer, further away from the Reilly site.

In the later 1970's the MDH used a more sensitive method of PAH analysis using High Performance Liquid Chromatography. This method allows detection limits to less than 10 parts per trillion (ppt) for each PAH component resolved on the chromatogram. As a result, St. Louis Park Well 10 (SLP 10) and SLP 15, which are contiguous, were closed in November 1978 due to elevated levels of PAH in the untreated water. SLP 7 and SLP 9 were also closed due to their proximity to the contaminated plume and due to the concern that, with SLP 10 and 15 shut down, the hydraulic gradient would be controlled by SLP 7 and 9 and thus, these wells would quickly become more contaminated. In December 1979, SLP 4 was also closed due to elevated PAH. SLP 5 was also closed due to elevated concentrations of PAH. In March 1981, a City of Hopkins Well, H3, was closed due to elevated concentrations of PAH. The amount of water supply lost to the City of St. Louis Park due to the closure of six wells is approximately 35% of the capacity existing prior to 1978, the year when wells were first closed. Consequently, the city instituted a water conservation program during the summer, increased pumping rates at uncontaminated wells and drilled a new well, SLP 17, to the deeper Mt. Simon-Hinckley aquifer. These measures do not provide a full water supply to the city. Even with SLP 17 on-line, the City still falls substantially short of peak water supply needs during the summer months. This is due, in part, to the limited yield of the Mt. Simon-Hinckley aquifer with the results that SLP 17 cannot be pumped at full capacity.

The City also has an agreement to purchase a limited amount of water from the neighboring City of Plymouth. However, Plymouth experiences water shortages and peak demands at the same time as the City of St. Louis Park. As a result, Plymouth cannot supply St. Louis Park on a consistent or dependable basis. This situation was highlighted last summer during a fire when the City turned on contaminated wells to provide enough water pressure in the distribution system. This situation is expected to recur in the future. The City has made plans to notify its citizens prior to returning contaminated wells to service for emergency situations.

Summary of Previous and Current Superfund Activities

There are three conceptual operable units involved with the Reilly Tar remedial response. These include: (1) restoration of drinking water supply to St. Louis Park, (2) containment or treatment of ground water in contaminated aquifers, and (3) source control of the bog and contaminated soil at the site.

In August 1981 the MPCA was awarded a cooperative agreement to investigate Well W23, and to perform a feasibility study for restoration of drinking water which serves as the basis for this Record of Decision. During that study the State removed coal tar deposits from Well W23 that were a source of ground water contamination. The well itself is now clean although some residual contamination probably remains in the aquifers penetrated by the well. In December 1982 a second $1.9 million cooperative agreement was awarded to the MPCA to accomplish the following tasks:

(1) An Immediate Remedial Measure to abandon multi-aquifer wells such as Well W105 located on site. This partially fulfills operable unit (2) above,

(2) Model and test previously proposed gradient control well systems in Prairie du Chien/Jordan Aquifer. This partially fulfills operable unit (2) above,

(3) Compile existing soil logs and analytical data to determine extent of contamination. This partially fulfills operable unit (3) above, and

(4) A feasibility study for the source material to fulfill operable unit (3) above.

Tasks number (2) and (3) are substantially complete. Tasks number (1) and (4) which constitute approximately $1.4 million of the cooperative agreement have been delayed while feasibility work accomplished by Reilly Tar through its consultants was conducted over the last year. Since the Reilly work was performed concurrently with implementation of the cooperative agreement, the MPCA and EPA withheld some major expenditures in anticipation of a useful work product produced by Reilly and possibly the implementation of certain cooperative agreement tasks by Reilly. To date, Reilly has not accepted the responsibility for implementation of the tasks under the current agreement which will be somewhat modified in an amendment forthcoming from the MPCA. The amendment will reflect the input provided by Reilly for solution of the total problems at the site. Due to the Reilly study, the MPCA will need only to perform a limited feasibility study for disposition of gradient control well discharge and some remedial investigation of soils off-site for the purpose of establishing deed restrictions and of Drift/Platteville and St. Peter Aquifers. There exists enough money in the current agreement to reprogram for design and construction of the highest priority task, the drinking water treatment system proposed in this Record of Decision. The remedy described herein pertains only to funding a water treatment system for St. Louis Park Well SLP 15/10. A second Record of Decision addressing the remaining site problems is anticipated for submittal following completion of the on-going feasibility activities.

ENFORCEMENT HISTORY

On September 4, 1980, the U.S. Department of Justice (USDOJ) filed a complaint against Reilly Tar under Section 7003 of RCRA. The State moved to intervene as a plaintiff.

On October 1980, an order was entered granting the State of Minnesota and the City of St. Louis Park leave to intervene as co-plaintiffs in Federal enforcement.

On February 25, 1981, a demand letter was sent from the U.S. Attorney to Reilly Tar.

On March 27, 1981, Reilly denied liability for any remedial action costs.

On August 17, 1981, another demand letter was sent to Reilly Tar requiring payment of $200,000 for remedial measures to be taken at the site by the MPCA through a cooperative agreement with EPA.

On September 25, 1981, a CERCLA Count was added to the complaint.

On January 15, 1982, Judge Paul Magnuson heard arguments on the Motion to Dismiss filed by Reilly Tar.

On August 20,1982, Reilly's Motion to Dismiss was denied.

On July 22, 1982, the USDOJ requested that Reilly submit a work plan for remedying the pollution problem at the Reilly Tar site within 30 days. Reilly did not submit a plan within that period.

At a meeting held on August 24, 1982, Reilly proposed to prepare a comprehensive plan to remedy the PAH problem. However, EPA and MPCA indicated that they would go ahead with the work planned under the cooperative agreement pending receipt of Reilly's plan.

Summary of Technical Discussions With Reilly

In May 1982, following a series of letters and meetings among the DOJ, EPA, MPCA, and Reilly Tar, Reilly proposed to perform its own comprehensive plan to solve the PAH problems in the St. Louis Park area. This was initiated in August 1982. The MPCA continued work on the feasibility study for water treatment under the cooperative agreement with EPA.

In May 1983, Reilly publicly presented its plan to clean up the contaminated site in St. Louis Park. During the summer, MPCA and EPA reviewed Reilly's plan. From August through December 1983, MPCA and EPA technical representatives met with Reilly Tar technical consultants to determine if the regulatory agencies and Reilly Tar had common solutions to the problems caused by Reilly's operation in St. Louis Park.

Discussions ended with Reilly in February 1984, when it did not concur with the remedial action proposed by the regulatory agencies for each of the aquifers.

Hydrogeology

In order to understand the problems at the Reilly Tar site it is necessary to understand the hydrogeology in the area. Coal tar released from the site has contaminated four aquifers located beneath the site (see Table 1 and the attached figures of the basin geology). The aquifers that are being studied under the current cooperative agreement with the EPA and MPCA are the following:

TABLE 1

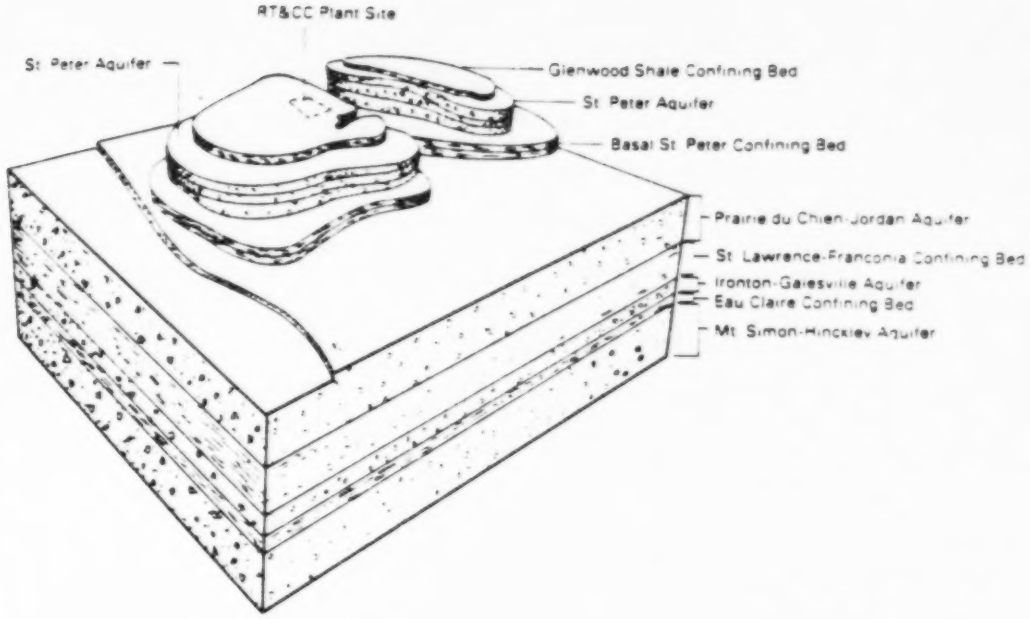
Hydrogeology Below Reilly Tar

Aquifer	Approximate Depth (ft.)	Use	Upper Range of Contamination (Total PAHs)
(1) Drift/ Platteville	0 - 90	Private/Industrial wells	1000 ug/l off-site
(2) St. Peter	90 - 200	Municipal/Private drinking water wells	< 10 ug/l off-site
(3) Prairie du Chien-Jordan	250 - 500	Municipal drinking water wells	10 ug/l off-site
(4) Ironton-Galesville	700 - 750	Industrial usage	< 10 ug/l is estimated to be on-site
(5) Mt. Simon-Hinckley	800 - 1100	Municipal drinking water wells	Not detected

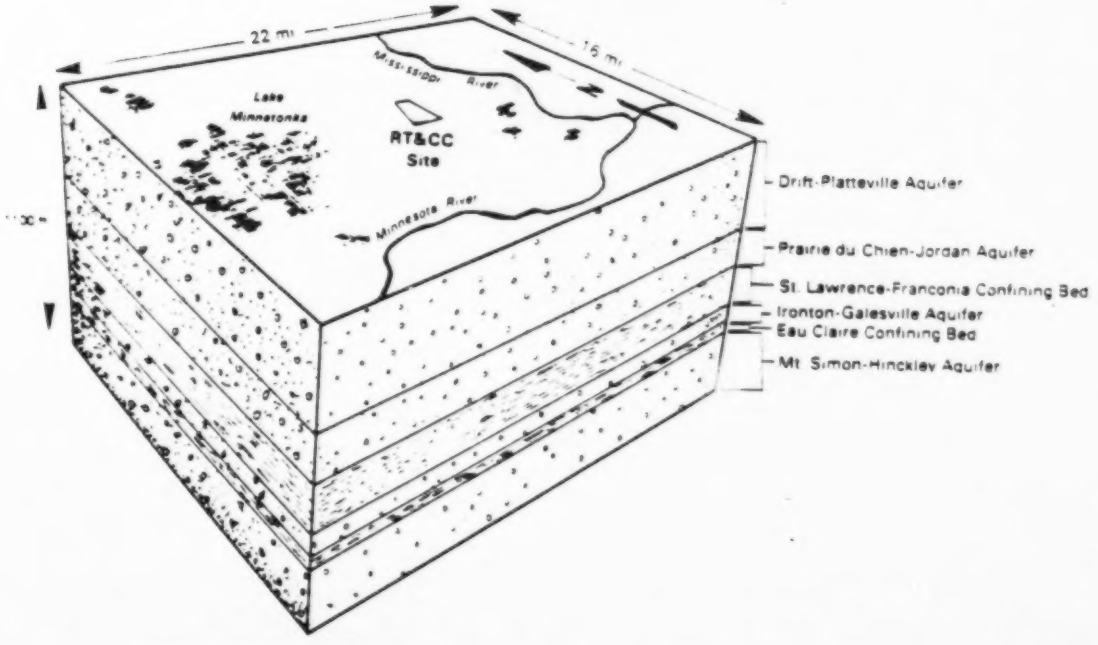
Ground water contamination in each aquifer under the site is approximately ten times higher than the off-site concentration shown above.

Current Site Status

The Prairie du Chien-Jordan Aquifer is the primary source of drinking water for 110,000 people in St. Louis Park, Edina, Hopkins and all communities adjacent to Minneapolis. The City of Minneapolis depends exclusively on the Mississippi River as its drinking water source and has considered utilizing the Prairie du Chien-Jordan as its secondary source of water supply in the future. The deeper Mt. Simon-Hinckley Aquifer is the second most extensively used drinking water aquifer for the area and it is utilized

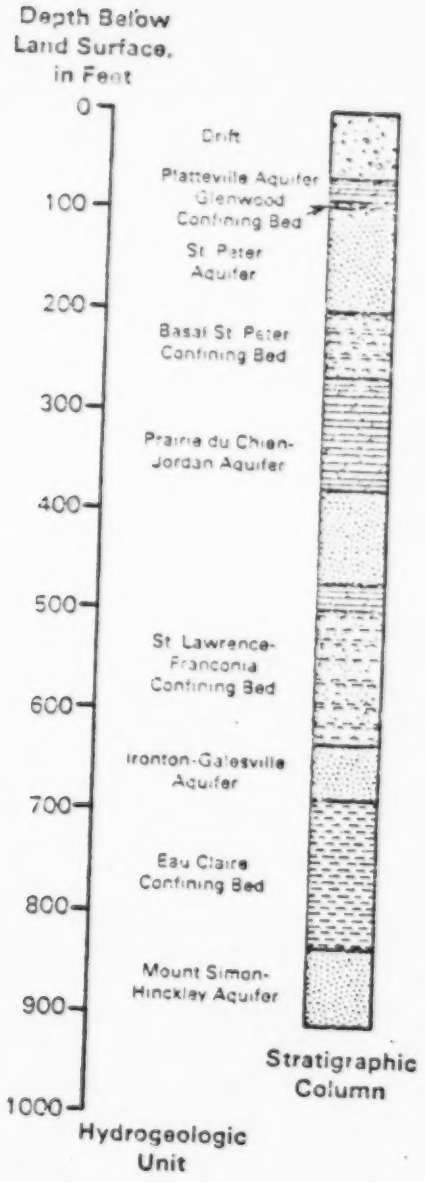


Geology Beneath Drift-Platteville Aquifer



Surface Features and Drift-Platteville Aquifer

Schematic View of Twin Cities Basin Geology



SUBSURFACE GEOLOGY UNDER
REILLY TAR SITE, ST. LOUIS PARK

to such an extent that the Minnesota Department of Natural Resources is concerned about further significant appropriation of water from this aquifer. The St. Peter Aquifer, while it once was a major source of water supply, is now a minor source of municipal drinking water supply because of the better water quality of the Prairie du Chien.

The uppermost aquifers, the Drift and Platteville, have in the past provided potable water to numerous private wells, but with municipal supplies becoming available, they are no longer used for potable purposes to any significant extent. However, there are still many private wells in the shallow aquifers which can be used for irrigation of lawns and gardens.

The extent of contamination in each aquifer varies greatly. No contamination has as yet been found in the Mt. Simon-Hinckley. The hydrogeology of the site suggests that the St. Peter aquifer is contaminated. Further sampling of wells near the site is expected to confirm this assumption. The area of contamination in the Prairie du Chien-Jordan extends east beyond Highway 169/100 and has the greatest potential public health impact due to the number of municipal water supply wells located just outside the presently known contaminated zone. The spread of contamination usurps the aquifer's potential as the primary source of drinking water.

Contamination of the Prairie du Chien-Jordan aquifer occurred by two modes. One is through direct contact of the aquifer with the coal tar material found in W-23. The material in this well has, for the most part, been removed. Another mode of contamination is through the inadequately constructed multiaquifer wells that allow contaminated water from the upper aquifers to be transported along the outer diameter of the casing into the deeper cleaner aquifers. These two mechanisms are the primary pathways of contamination of the Prairie du Chien-Jordan aquifer which resulted in the closure of 6 St. Louis Park wells and 1 City of Hopkins Well.

Releases of PAH and related coal-tar distillate material to the environment are still occuring. The primary methods of contamination of the uppermost aquifer (Drift/Platteville Aquifer) is through the contaminated soil at the site and the bog south of the site which act as sources for migration into the ground water. Contamination of the uppermost aquifer has been found to a depth of 90 feet in the bog area. It seems that the contamination is not evenly distributed throughout the bog, rather, the area and depth of soil contamination appears to be representative of a channel into the bog area. This is probably a consequence of the ditches used by Reilly to dispose of wastes. As the contamination dissolves into the aquifer it moves east, southeasterly where it migrates through a bedrock valley into the Platteville aquifer and toward the St. Peter Aquifer.

Drinking Water Criteria for PAH

The Minnesota Department of Health (MDH), since 1978, has been monitoring the water quality of the Prairie du Chien/Jordan aquifer for low concentrations of coal tar compounds, particularly PAH. Using the EPA published "Ambient Water Quality Criteria for Polynuclear Aromatic Hydrocarbons",

October 1980, the MDH developed a limitation of 28 ng/l for the sum of carcinogenic PAH. This represents a 10^{-5} health risk which, in theory, implies that one out of 100,000 people who drink two liters of water contaminated at this level for 70 years will contract cancer from this source. The MDH recommended a limitation of 280 ng/l for "other" PAH in drinking water. This was not based on a model; rather, the Department had concerns over the relationship of "other" PAH to the activation of carcinogenic PAH, the inability of the analytical method used at the time to distinguish between certain carcinogenic and "other" PAH compounds and also over the possibility that "other" PAH may still be toxic, tumor promoters and/or mutagens. In the context of this Record of Decision, carcinogenic compounds and carcinogenic PAH compounds are defined as those compounds that, when appropriately tested, produce cancer in at least one animal species. "Other" PAH compounds or "other" compounds are those compounds that were not tested for carcinogenesis and those compounds that, when appropriately tested, did not produce cancer in at least one animal species.

EPA recommends a target health risk of 10^{-6}. Using the same EPA Water Quality Criteria document as the MDH, this value would correspond to 2.8 ng/l of Benzo(a) Pyrene (BaP), the most potent carcinogen of the PAH family found in the environment. Therefore, EPA would prefer a technology capable of achieving a limit corresponding to a 10^{-6} health risk, if it is technologically feasible.

Heterocyclic compounds less potent than BaP, have been measured in the ground water and will, to some extent, be found in the finished water. Quinoline, for example, is less potent than BaP and has a 10^{-6} health risk concentration at 1,100 ng/l. Reducing Quinoline and other like carcinogens all to the level of reduction for BaP results in conservative protection of the drinking water population's public health. To do this the ratio of the sum of all the known carcinogenic compounds to the sum of all PAH and heterocyclic compounds found in the water supply was determined. These values vary but to be consistently conservative, the sum of all known carcinogens is, at the most, 70 ng/l based on the historical data at SLP 15. Based on the same data the total PAH and heterocyclic compounds found in the water supply is, on the average, about 7000 ng/l. Based on the variation of the data a ratio of carcinogenic compounds to total PAH and heterocyclic compounds is between 0.007 to 0.01.

Using the more conservative ratio of 0.01, the concentration of carcinogens found in the drinking water can be calculated. The application of this ratio is also conservative because its use assumes that the effluent characteristics of the PAH compounds from various treatment systems are the same as the attenuation of these compounds by the aquifer they travel through. Another conservative assumption used in the rationale and applied to the table below, is that the carcinogenic compounds measured in the drinking water are as potent as BaP. The use of this assumption accommodates the uncertainty in determining the health risks due to the interaction of carcinogens and known tumor promoters found in the water supply.

Sum of all PAH and Heterocyclic Compounds	Ratio of Health Risk Compounds to Total Compounds in the Drinking Water Supply	Resulting Concentration of Health Risk Compounds in Treated Water	Risk Based on BAP
2000 ng/l	0.01	20 ng/l	$<10^{-5}$
1000 ng/l	0.01	10 ng/l	$<10^{-5}$
280 ng/l	0.01	2.8 ng/l	$<10^{-6}$
70 ng/l	0.01	0.7 ng/l	$<10^{-6}$
<10 ng/l	0.01	0.1 ng/l	$<10^{-7}$

It has been suggested that the drinking water criteria for the City of St. Louis Park be determined by examining background levels of PAH found in other drinking water supplies locally and nationally. These levels could then be compared to levels obtained through various treatment technologies.

While national data provide an important and useful tool, such data are not necessarily determinative. The National Contingency Plan (NCP) requires the EPA to make site specific determinations of the appropriate remedial action. In the case of St. Louis Park, national data have been carefully evaluated. EPA rejects the concept that drinking water for St. Louis Park need only be treated to the same PAH levels as the drinking water supply of the highest level in the country. To use the municipal supplies with the highest PAH concentrations in the country as a bench mark would ignore important local factors, such as the fact that prior to closure of the wells in 1978 the residents of St. Louis Park were consistently exposed over an undeterminable amount of time to abnormally high levels of PAH in their drinking water. Furthermore, it must be recognized that simply because certain drinking water systems draw on surface supplies, which typically have higher levels of PAH than ground water, does not imply that those levels are appropriate.

In the case of St. Louis Park, EPA recommends a conservative approach to protection of public health from carcinogenic PAH found in the drinking water aquifer. The ramification of recommending a health risk of 10^{-6} for carcinogenic PAH exerts a limitation for "other" PAH that would not exceed 90% of the drinking water systems thus far measured nationwide for PAH. The range of values, depending on regression of existing data, would fall between 150 to 300 ng/l for "other" PAH. The 10% of municipalities that have been identified as having higher concentrations for "other" PAH all draw their supplies from surface waters, not ground water.

The comparison of the background levels of "other" PAH (less than 120 ng/l) found in neighboring cities and again to the criterion developed by the MDH (280 ng/l) for "other" PAH, shows that these values are essentially equivalent. MDH is confident, and EPA agrees, that a level of approximately 280 ng/l for "other" PAH, and 2.8 ng/l for carcinogenic PAH will assure less than or equal to a 10^{-6} health risk to the population.

ALTERNATIVES EVALUATION

In August 1982, MPCA contracted with CH_2M Hill to complete the evaluation of water supply alternatives for St. Louis Park started under earlier studies.

The scope of this study was designed to fill in data gaps from previous studies and to provide sufficient information for the MPCA to select a water supply alternative for St. Louis Park. The Scope of Work was modified as the study progressed to compensate for new information and to effectively mesh this study with other ongoing studies by MPCA. The objectives of this study included:

- Collect and analyze water samples from nearby communities to compare water quality goals for St. Louis Park with other water supplies in the area.
- Develop water quality and quantity goals for restoring potable water supply capacity to the city of St. Louis Park.
- Develop and evaluate water supply alternatives which will restore water supply capacity to the City of St. Louis Park. Prepare capital and O&M costs estimates for each alternative and discuss the relative advantages and disadvantages of each alternative considered, including no action.
- Perform a cost-effectiveness analysis of the water supply alternatives. Prepare a recommendation for implementation based on cost and technical considerations.
- Prepare a conceptual design and capital and O&M cost estimates for the full-scale system.

Summary and Conclusions

The following objectives were established to provide a common basis for developing and evaluating water supply alternatives for St. Louis Park:

- Total supply shortfall of 3,400 gpm.
  - 1,200 gpm year-round usage for SLP 15/10.
  - 2,200 gpm "peaking" usage, three weeks per year, possibly utilizing the wells currently closed (SLP 7,9).
  - restore pre-1978 capacity.
- Water quality equivalent to pre-1978 water quality in St. Louis Park.

The alternatives that satisfied these objectives were:

- Treatment of SLP-15/10 to provide potable water and start-up SLP-7 and -9.
- Install interconnection with City of Minneapolis water distribution system.
- Install new wells in the deeper uncontaminated Mt. Simon/Hinckley Aquifer.

The no action alternative was also evaluated.

An assessment of technologies was conducted to screen potentially applicable technologies for removal of PAH and other coal tar derivatives from ground water. The following technologies were selected as most appropriate for further evaluation and bench-scale test work:

- Oxidation Processes
  - Ozone (O_3).
  - Ozone/Ultraviolet (O_3/UV).
  - Hydrogen Peroxide/Ultraviolet (H_2O_2/UV).
  - Chlorine Dioxide (ClO_2).
- Adsorption Processes
  - Granular Activated Carbon.
  - Powdered Activated Carbon.
  - Macroreticular Resin.
- Membrane Processes
  - Reverse Osmosis.
  - Ultrafiltration.

SLP 15/10 was started up and well water was passed through the existing iron removal treatment system in September 1982. Water samples were obtained at various points in the treatment system and analyzed for PAH. Eighty percent removal of PAH was measured across the system, but effluent did not meet MDH's treatment goal of 280 ng/1 total "other" PAH. Bench-scale tests indicated that the unit operations employed at the existing treatment system were ineffective in removing most PAH compounds. To resolve the discrepancies between the first onsite test and the bench-scale results, a second onsite test was conducted in December 1982. The results of the second onsite test corresponded well with bench scale results. It was concluded that the unit operations employed at the existing treatment system are not adequate to provide PAH removals for a potable water treatment system at SLP 15/10 nor were they reliable.

Only three technologies tested during the bench-scale testing program met the MDH treatment goals:

- Granular Activated Carbon (GAC).
- Ozone/Ultraviolet (O_3/UV).
- Hydrogen Peroxide/Ultraviolet (H_2O_2/UV).

Conceptual designs were prepared for full-scale treatment systems using each of the above technologies. Comparative capital and annual O&M costs were estimated for each system, and the features of each system were examined. Based on both cost and technological considerations, GAC was selected for pilot-scale testing. A 42-day pilot-scale test of GAC was conducted at SLP 15/10. Based on the results of the pilot test, design criteria were developed for a full-scale GAC treatment system at SLP-15/10. The pilot-scale test was adequate to provide system design criteria, but could not be run long enough to accurately define carbon adsorption capacity in a full-scale system. Based on information gained in bench and pilot-scale testing, a range for expected carbon adsorption capacity was developed.

Powdered activated carbon (PAC) did not meet the criteria for bench scale testing and thus was not evaluated in detail. It had substantially the same construction cost ($600,000) for mixing tank, clarifier and piping as the GAC but the O&M cost to meet the drinking water levels was impractical to consider due to the high and inefficient use of carbon. Since the amount of PAC required is higher than GAC, use of PAC will result in higher O&M costs and increase the risk that contaminants would pass through before adjustments were made. Furthermore, substantial amounts of carbon residue would be generated and removed on a frequent basis thereby increasing the maintenance cost of the system when compared to GAC. Hydrogen peroxide/ ultraviolet treatment was evaluated and eliminated due to high capital and O&M costs. Capital cost was $1.158 million and annual O&M cost is estimated at $281,000 to reach the recommended treatment level. The present worth of this technology was $3.806 million, significantly higher than GAC or ozone.

After completion of the treatment technology review and testing program, the following alternatives were identified for detailed evaluation:

- Alternative No. 1 - Treat SLP 15/10 with Granular Activated Carbon for Potable Supply and Start Up SLP-7 and -9.
- Alternative No. 2 - Install Interconnection with City of Minneapolis Water Distribution System.
- Alternative No. 3 - Install Wells in Mt. Simon/Hinckley Aquifer.

The no action alternative was eliminated because of the documented contamination above the State and EPA's recommended targets at the drinking water wells, the consequent water supply shortfall, and the knowledge that the plume is continuously spreading toward other water supplies. Return of SLP 15/10 to operation would help retract the plume and when combined with proposed future remedial measures it would protect other cities.

Discussion of Alternatives

Costs for both treatment and non-treatment alternatives were developed and are shown in Table 2. The costs for treatment alternatives were developed over a range of treatment levels that correspond to various health risks. The treatment levels vary from sub organoleptic (i.e., beneath taste and odor) concentrations of 3000 to 4000 ng/l of other PAHs down to less than 10 ng/l. The associated risks are shown on Table 2. These cost estimates indicate that at the higher treatment range ozone is less expensive than granular activated carbon. As the treatment levels decrease to the target levels recommended by the State and EPA granular activated carbon becomes the less expensive alternative.

It can be seen that costs for deeper wells and for treatment of the Prairie du Chien/Jordan are similar, with treatment to the recommended PAH level slightly cheaper. This is due to the high expense of drilling to the Mt. Simon-Hinckley Aquifer which the City completed in the summer of 1983. The cost for one well was approximately $600,000 due to the geologic factors that makes drilling and casing expensive. Furthermore, it is probable that iron removal facilities will be necessary for water taken from the Mt. Simon Hinckley Aquifer. The cost of these facilities (estimated at $400,000 per well) is not included in Table 2.

Installation of potable water supply wells in the Prairie du Chien/ Jordan aquifer upgradient of the contamination was considered, however, costs would be similar to installing wells in the Mt. Simon-Hinckley, and in addition, installing new wells upgradient of the plume would tend to retract the plume and pollute other SLP water supply wells.

Based on the above cost evaluation, treatment of the Prairie du Chien/Jordan aquifer is the least costly alternative that meets the remedial action objectives. Either treatment with ozone or granular activated carbon will satisfy the objectives. However, granular activated carbon treatment is recommended for the following reasons:

(1) It can be operated over a wide range to remove carcinogenic and other compounds to below detection limits, 1-2 ng/l (corresponding to less than 10^{-6} health risk), or up to higher levels such as the sub taste/odor threshold, of 3000-4000 ng/l of other PAH. At the limits of 2.8 ng/l for carcinogenic PAH, pilot plant data shows that no other PAH will be detected in the treated water.

(2) It can accept slug loads without upset and with no need to adjust operation of the system. System regeneration is predictable.

(3) It can be maintained with less operator oversight than other competitive technologies.

(4) There is no generation of by-products which could became health risks.

(5) GAC is a proven technology, preferred by the EPA-Office of Drinking Water, and represents the best available technology for this problem.

Table 2

COSTS OF ALTERNATIVES (x 1000)

CARCINOGENIC HEALTH RISK	TOTAL PAH ng/l	OZONE			GAC			ALTERNATE SUPPLIES		
		CAPITAL	O/M	PRESENT WORTH	CAPITAL	O/M	PRESENT WORTH	CAPITAL	O/M	PRESENT WORTH
A. Treatment Alternatives										
10^{-5} to 10^{-6}	2000									
10^{-5} to 10^{-6}	1000	374	132	1,618	633	161	2,150			
$< 10^{-6}$ to 10^{-6}	280	459	175	2,108	633	173	2,263			
$< 10^{-6}$	< 70	709	183	2,434	633	188	2,405			
$< 10^{-6}$	< 10									
B. Non-Treatment Alternatives										
Hookup to Minneapolis								250	833	8,102
Drill Deeper Wells								1,870	111	2,916

NOTES:

1. Present worth cost determined at 10%, 30 years.
2. 2000 ng/l = Sub Organoleptic Threshold.
3. GAC and O_3 costs are approximately constant for limits < 280 ng/l.
4. O_3 costs include $60,000 for pilot work.
5. Health risk of carcinogenic compounds based on break through of non-carcinogenic compounds associated with non-carcinogenic limit (Based on BaP at 2.8 ng/l = 10^{-6}).

12-a

Ozone technology, in addition to being slightly more expensive at the recommended treatment level, is less desirable for use in a drinking water system for several reasons:

(1) Ozone generation and dosage is proportional to influent concentrations which will vary with operation of the system; therefore, the use of conservative (high) dosages tend to result in increased costs of operation.

(2) If a slug load passes through the system it would not be totally treated, and by-products with possible health risks could be generated according to a review of relevant literature.

(3) If influent concentrations exceed design criteria, the contaminants would pass through the system and adjustment of the system could not be made until analytical results are received. This would probably take 1 to 2 weeks, during which time contaminants would enter the drinking water system, possibly exposing the population to health-risk related compounds.

(4) Two different ozone treatment systems were compared, for the various degrees of treatment. For limitations between 4000 ng/l and 1000 ng/l only ozone is necessary. For less than 1000 ng/l ozone with UV lamps is necessary. Ozone is cost-competive to approximately 1000 ng/l. Below that, GAC is cost-effective. If ozone were implemented as a treatment technology, for levels above 1000 ng/l, and subsequently the regulatory agencies determined lower limitations were necessary, the installed ozone treatment system could not be retrofitted to meet the more stringent limits.

For economic reasons, ozone would be suitable and preferred for a discharge to surface water.

RECOMMENDED ALTERNATIVE

Section 300.68(j) of the National Oil and Hazardous Substances Contingency Plan states that EPA shall select the cost-effective alternative (i.e. the lowest cost alternative that is technologically feasible and reliable and which effectively mitigates and minimizes damage to and provides adequate protection of public health, welfare, or the environment).

EPA has determined that the treatment of St. Louis Park well SLP-15/10 with granular activated carbon will achieve the above requirements (See Figure 9-1 for system diagram). Other alternatives were evaluated that would provide adequate public health protection but these are not recommended for the following reasons. Interconnection with the City of Minneapolis would provide an adequate supply and has the lowest capital cost of all the alternatives. However, the cost of purchasing water over time causes the present worth cost to be significantly higher than any alternative.

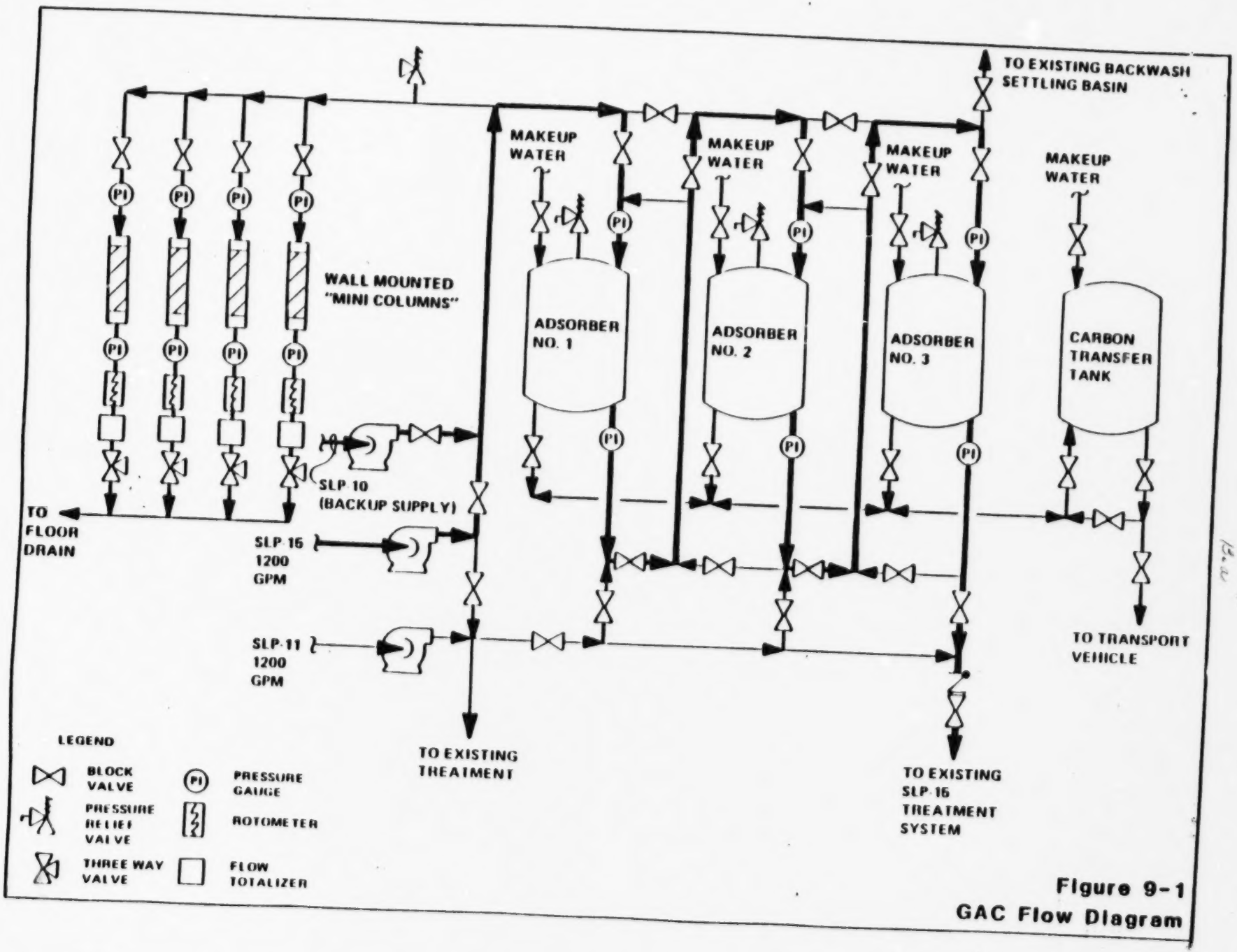


Figure 9-1
GAC Flow Diagram

Installation of deeper wells to the Mt. Simon-Hinckley aquifer is only slightly more expensive than the recommended alternative. This alternative is technically less complex than the recommended alternative since it is not dependent on a treatment system to remove PAH compounds. However, this alternative was not recommended since the experience gained when the City installed a new well in the Mt. Simon-Hinckley aquifer showed that the quantity of ground water was below the original expectation. This indicates that this aquifer may not be capable of providing the necessary quantity of ground water over a long-term. The State recognizes this situation and is concerned about future significant withdrawal of water from this aquifer. Therefore, this alternative is not recommended.

The alternative of treating contaminated water from the Prairie du Chien aquifer is the least expensive alternative to provide an acceptable water supply and has the additional advantage of mitigating the existing plume of contamination. Pumping and treatment of well SLP-15/10 will act as a barrier to contamination and allow the renewed use of wells SLP-7 and SLP-9 for drinking water use. This alternative will also help control migration of the plume and remove contamination from the environment. In addition, pumping and treatment of SLP-15/10 will probably be a component of a future remedial action to control migration of the entire plume of contamination. That action will be addressed in a future Record of Decision; however, selection of the recommended action for treatment of SLP-15/10 will reduce the cost of the future plume control action, if approved.

The recommendation for use of granular activated carbon rather than ozone is based on its lower cost and higher confidence to consistently meet the required treatment level. EPA's recommended target for carcinogenic PAH (based on benzo (a) pyrene) is 2.8 ng/l which corresponds to a 10^{-6} risk factor. Use of granular activated carbon is also recommended over ozone since GAC has been proved to be reliable over a wide range of operating conditions and is considered best available technology for water supply treatment. Therefore, granular activated carbon treatment provides the least cost with the highest flexibility and reliability of treatment.

Design and construction of a GAC system is expected to take 8 months after initiation of design. Additional funds for this task are not necessary at this time since the MPCA is able to reprogram funds available in the existing cooperative agreement. Additional funding will be requested in the future for further remedial action, as appropriate. The MPCA and Region V consider the construction of a drinking water system the highest priority for cleanup of the Prairie du Chien aquifer. Other tasks already approved and funded i.e., feasibility study for the soils and multi-aquifer well closing can be initiated this fall. However, due to the amount of data produced by Reilly Tar in its report, "Recommended Plan for a Comprehensive Solution of the Polynuclear Aromatic Hydrocarbon Contamination Problem in the St. Louis Park Area," and data produced by other sources, the scope of any future feasibility study for source control will be substantially modified. The design of the water treatment system can commence immediately upon approval of the Record of Decision since CH_2M Hill is still under contract with the MPCA for this work.

COST ESTIMATE

The total capital cost of GAC treatment is $633,000. Piping to SLP 10 and hookup of SLP 10 to SLP 15 is approximately $49,000. Design of the system is estimated at $68,000, and the first year O&M Cost is estimated at $188,000.

Therefore, the total capital cost estimate is $750,000. The MPCA can reprogram this amount with existing funds originally obligated by EPA for IRM/FS work at the site. The first year O&M cost of approximately $188,000 will be requested in a subsequent amendment.

OPERATION AND MAINTENANCE

The first year operational cost for which funding is requested is $188,000. The State of Minnesota accepts the oversight responsibility of monitoring the effectiveness of the system. The State will assure the future O&M as required by section 104(c)(3) of CERCLA, but EPA and the State may seek to transfer that responsibility to either Reilly or the City, or both, through enforcement action or negotiations.

NEXT STEPS

Milestones	Date
Sign ROD	May 1984
Amend CA for Design and Construction	June 1984
Complete Design	August 1984
Complete Construction	June 1985

FUTURE REMEDIAL ACTIONS

Following completion of the feasibility study being conducted by the State, another ROD will be prepared to address the following possible actions:

(1) Off-site remedial measures to control contaminated ground water plumes in multi-aquifers beneath the site, and

(2) Source control measures to minimize the release of hazardous substances from the site.

PUBLIC RESPONSIVENESS SUMMARY

The MPCA has attempted to keep the residents of the affected area well informed and has made positive effort to respond to their concerns. For this purpose, the Agency hired a community relations coordinator during the course of the RI/FS work.

The public was informed of the initiation of the drinking-water feasibility study at a public meeting held on February 15, 1982, at the public high school in St. Louis Park. Approximately 100 people attended the meeting.

A second public meeting at the high school held on May 16, 1983, reported the results from the feasibility study. An audience of more than 100 people heard presentations by Executive Director, Sandra Gardebring and Michael Hansel of the MPCA, Commissioner Mary Madonna Ashton and David Gray of the Minnesota Department of Health (MDH), Paul Bitter of the U.S. EPA and representatives of CH2M-Hill and Barr Engineering, the project's contractors. Two fact sheets were distributed at the meeting covering the background of the problem and the feasibility study results.

Questions and comments about the feasibility study were solicited at the public meeting and thereafter. In addition to responding to telephone calls from concerned citizens and questions from news reporters, the MPCA has endeavored to keep the public informed of progress in several ways.

An MPCA Board - appointed citizens advisory committee made up of local residents has met monthly since the summer 1983 to provide regular communication between the MPCA and the local community. Members of that organization have heard from the MPCA, the MDH and Reilly's Technical Consultants, ERT, and deliberated the issue.

Other efforts to inform the community have included the publication of feasibility study results and articles on advisory commitee progress in the city news letter sent to every resident of St. Louis Park on a bi-monthly basis. The St. Louis Park public library has received a copy of the feasibility study report, sheets, and an advisory committee statement. The availability of the fact report was announced on the City's "bulletin board" on cable television.

Because the meeting announcing the results of the feasibility study preceded a Reilly-sponsored meeting reporting the company's recommendations, many comments received in the time period immediately following the meeting considered the differences in the proposals and the progress of the litigation. A few comments urged the MPCA to consider the ERT report carefully, and considerable MPCA and U.S. EPA staff time has been spent examining ERT's work inclusions.

Questions at the public meetings fell into three main categories,
(1) those considering the carbon filter system and drinking-water safety,
(2) those regarding other remedial actions that may be necessary and,
(3) those asking about cleanup and cost and the progress of the litigation.
For instance, residences wanted to know how carbon was able to remove

contaminates from the drinking water and what happened to the spent carbon. The technology of carbon filtration and regeneration for reuse for other purposes was explained. Residents were assured that the filtered water would be tested monthly with a 3- or 4- day turnaround on test results, in response to questions about "breakthrough." One questioner wanted to know whether the carcinogenic PAH were readily adsorbed, as well as the other PAH, to which the response was "yes". A few questions regarded the PAH criteria level, which the MDH representative explained represents an expected 10^{-5} risk level. No support was expressed for the other alternatives considered by the feasibility study, including the connection with Minneapolis Water System or deep wells.

Concerns on other remedial measures included questions on the rate of groundwater movement, multi-aquifer wells and other remedial action that might be anticipated. It was explained that the study of the groundwater was not complete but the using of granular activated carbon on well 15/10 was part of an overall plan to control groundwater movement and the spread of contamination. The results of the well survey and progress on well abandonment were described. It was explained that a prohibition on new multi-aquifer wells will prevent the creation of new problems.

Several comments were received urging the agency to continue with its litigation efforts in expressing the opinion that the company should bear the cost of cleanup.

At the time of the public meeting and in the time that followed, support for the carbon filter system has been strong. A major concern remains the question of the City having to return contaminated wells to service, as it did during the summer of 1982. A water conservation committee was established by the St. Louis Park committee counsel to recommend reduced water usage (in addition to the City's ordinance regulating loss due to sprinkling during the summer months).

The City Council has adopted a resolution encouraging the MPCA to proceed with the carbon filter system. The Citizen's Advisory Committee reached consensus on a statement including similar reports. Candidates for City Council seats in the fall of 1983 elections all expressed support, as has the area's legislative delegations.

News media and public criticism has focused primarily on the delay in implementation. The community is well educated in the drinking-water problem experienced by the City over the years, and carbon filtration appears to be not only accepted but desired by the public.